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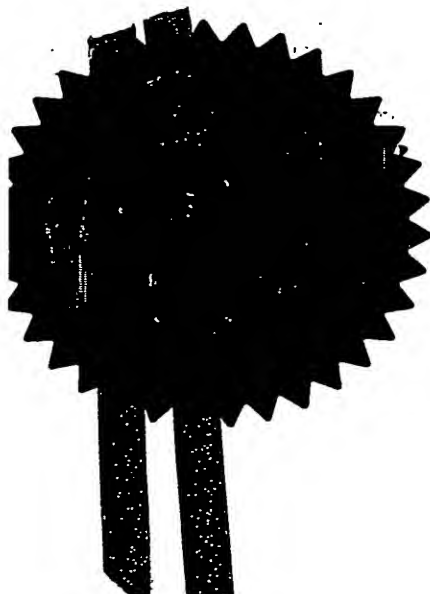
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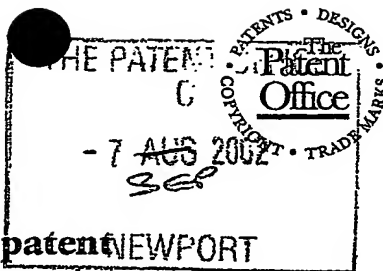
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Patent 1977  
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105EP02-ET46-55-3 D00239  
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RSN/MK/JMP/P12328GB

2. Patent application number

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3. 0220843.7 (surnames)

or of

Matsushita Electric Industrial Co., Ltd.  
Kadoma-shi,  
Osaka 571-8501  
Japan

Patents ADP number (if you know it)

If the applicant is a corporate body, give the country/state of its incorporation

Japan

591933087

4. Title of the invention

IMPROVEMENTS TO TELEVISION AND RADIO  
PROGRAMME CONTROL

5. Name of your agent (if you have one)

CRUIKSHANK & FAIRWEATHER

"Address for service" in the United Kingdom to which all correspondence should be sent (including the postcode)

19 Royal Exchange Square  
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574002

547002

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Country

Priority application number  
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Date of filing  
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Description 32

Claim(s) 14

Abstract

Drawing(s) 5 + 5 RM

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6 September 2002

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Dr R.S. Naismith

0141 221 5767

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## Improvements to Television and Radio Programme Control

The present invention relates to an improved system and method of channel scanning in television and/or radio systems.

5 Digital television can deliver hundreds of channels. Because of this, users need a simple and efficient method of navigating these channels. Electronic programme guides (EPGs) address this problem to an extent. However, despite the relatively  
10 sophisticated functionality provided by EPGs, it seems that people continue to 'hop' or 'surf' or switch through the range of available channels using their remote controls. This is commonly referred to as "zapping". That is, viewers simply use the 'programme  
15 up' and 'programme down' controls. Hence, a viewer may look through many, many channels before deciding to stop and watch something. If that item, or program, on that channel fails to interest the viewer, they re-start their search. A difficulty with this is that  
20 they have to re-scan many channels again.

Channel zapping on a digital television also suffers from the problem that it can take a perceptible time to decode and, possibly, decrypt incoming signals, such as MPEG, DVB, ATSC or ARIB streams. Some channel changes  
25 inevitably involve the changing of receiver frequency or

polarisation. This means that the receiver has to begin demodulating a new radio frequency signal. These problems exist for all types of modulation, including COFDM, 8-VSB, QAM, etc. This means that the user experiences a  
5 delay changing channels on a digital TV system, whereas an analogue system changes channel almost instantly. This can be particularly annoying for the user if they have to scan through numerous channels that they have already viewed.

10 An object of the invention is to provide improved channel scan functionality for television and digital radio.

According to one aspect of the present invention, there is provided a method for controlling channel  
15 changes in television or digital radio having a tuner or receiver, the method involving monitoring channel change commands received over a zapping session; identifying discarded channels; and preventing the tuner or receiver from returning to the discarded  
20 channels during the rest of the zapping session or until it is determined that a program transmitted on the discarded channel has changed.

By preventing the tuner or receiver from returning to discarded channels that are of no interest to the  
25 user, redundant channel selections are removed from the

zapping process. Hence, if a user has already 'channel  
hopped' to a particular channel, and the same item or  
programme is showing, then that channel will be  
excluded from the 'channel hopping' process during the  
5 zapping session.

The step of identifying discarded channels may  
involve monitoring a time for which the viewer viewed  
the channel and on the basis of this, determine whether  
the channel is discarded. The method may further  
10 involve setting a viewing time threshold for use in the  
step of determining whether the channel is to be  
discarded. Various options for using the threshold to  
determine whether or not a channel is to be discarded  
may be employed. The choice of which option to use can  
15 be made by the viewer or be pre-determined. For  
example, the method may involve discarding the channel  
if the monitored viewing time is at most the viewing  
time threshold. Alternatively, if the monitored  
viewing time is at most the viewing time threshold,  
20 then the channel may be retained. Alternatively if the  
monitored viewing time is at least the viewing time  
threshold, then the channel may be discarded. As a yet  
further alternative, if the monitored viewing time is  
at least the set viewing time threshold, then the  
25 channel may be retained.

The step of identifying discarded channels may involve receiving from a user an indication of a programme or item type that is to be discarded; monitoring the type of programme currently being  
5 provided on available channels and discarding those channels that are currently broadcasting programmes or items of the type indicated by the user. The programme type may be, for example, sports programmes or current affairs programmes or advertisements.

10 The method may further comprise determining whether a programme on a particular channel has changed.

The method of determining whether a programme has changed may involve comparing programme identifiers for  
15 the previously viewed programme and the programme currently available. In the event that there is a match, then it is determined that the programme has not changed and so the channel is not re-introduced to a list of channels that are available for scanning. In  
20 the event that there is not a match, then it is determined that the programme has changed. In this case, the channel is re-introduced into the pool of channels that can be zapped to.

Additionally or alternatively, the step of  
25 determining whether a programme on a particular channel

has changed may involve monitoring real-time using for example a real time clock or timing information included in a broadcast; identifying programme scheduling information for a particular channel and  
5 using the scheduling information and real-time to determine whether there is a change in the currently broadcast programme.

The method may further involve receiving a control signal from the user that indicates that a channel  
10 zapping session is starting, this signal prompting the start of the step of monitoring the channels zapped to and those discarded. This signal may be adapted so as to identify different users, so that, for example different family members can start new zapping  
15 sessions. The method may further involve receiving from a user a signal that is indicative of a command to stop the channel zapping session.

The method may involve terminating the channel zapping session if no channel change commands are  
20 received over a pre-determined time.

The method may further involve identifying an advertisement, temporarily excluding the channel that the advertisement is being shown on from the pool of available channels and re-introducing the channel when  
25 the advertisement is finished. Alternatively, the



method may involve identifying an advertisement and showing in place of the advertisement material, such as a video clip or text, which is associated with the programme that is to be shown when the advertisement is finished. The method may further involve recording a portion of the programme being broadcast immediately before the start of the advertisement and displaying this to the user during the advertisement. Of course, in this case, the method preferably involves checking that the same programme is being continued after the advertisement is finished.

The method may further involve monitoring programme changes; identifying the most recently provided or broadcast programme and presenting the most recently provided or broadcast programme to the user in response to a channel change command. In this way, the most recently started programmes are automatically given priority during the zapping session.

The method may further involve receiving channel change commands from a remote control unit.

According to another aspect of the present invention, there is provided a system for controlling channel changes in a television or digital radio system having a digital tuner or receiver, the system comprising means for monitoring channel change commands

received from a user over a zapping session; means for identifying discarded channels; and means for preventing the tuner or receiver from returning to the discarded channels during the rest of the zapping  
5 session or until it is determined that a programme transmitted on the discarded channel has changed.

The means for identifying discarded channels may be configured to monitor a time for which the viewer viewed the channel and on the basis of this, determine  
10 whether the channel is discarded. The system may further include means for setting a viewing time threshold for use in the step of determining whether the channel is to be discarded. Various options for using the threshold to determine whether or not a  
15 channel is to be discarded may be employed. These options include: discarding the channel if the monitored viewing time is at most the viewing time threshold; retaining the channel if the monitored viewing time is at most the viewing time threshold;  
20 discarding the channel if the monitored viewing time is at least the viewing time threshold, and retaining the channel if the monitored viewing time is at least the set viewing time threshold. The particular option that is to be used can be selected as desired either by the  
25 designer of the system. Alternatively, means may be provided for presenting to a user the various options

that are available and receiving a user selection of one of the options.

The means for identifying discarded channels may comprise means for receiving from a user an indication  
5 of a programme or item type that is to be discarded; means for monitoring the type of programme currently being provided on available channels and means for discarding from the channels that are available for  
10 zapping those channels that are currently broadcasting programmes or items of the type indicated by the user. The programme type may be, for example, sports programmes or current affairs programmes or advertisements.

The system may further comprise means for  
15 determining whether a programme on a particular channel has changed.

The means for identifying whether a programme has changed may be operable to compare programme identifiers for the previously scanned channel and the  
20 programme currently available. In the event that there is a match, then it is determined that the programme has not changed and so the channel is not re-introduced to a list of channels that are available for scanning. In the event that there is not a match, then it is  
25 determined that the programme has changed. In this

case, the channel is re-introduced into the list of channels that can be zapped to.

Additionally or alternatively, the means for determining whether a programme on a particular channel  
5 has changed may comprise means for monitoring real time; means for identifying programme scheduling information for a particular channel and means for using the scheduling information and real time to determine whether there is a change in the currently  
10 broadcast programme.

The system may be adapted to receive a control signal from the user that indicates that a channel zapping session is starting, this signal prompting the start of the step of monitoring the channels zapped to  
15 and those discarded. The system may be further adapted to include a receiver for receiving from a user a signal that is indicative of a command to stop the channel zapping session.

Means may be provided for terminating the channel  
20 zapping session if no channel change commands are received after a pre-determined time has elapsed.

The system may be further configured to identify an advertisement, temporarily exclude the channel that the advertisement is being shown on from the pool of  
25 available channels and re-introduce the channel when

the advertisement is finished. Alternatively, the system may be configured to identify an advertisement and show in place of the advertisement material, such as a video clip or text, which is associated with the programme that is to be shown when the advertisement is finished. The system may further include means for recording a portion of the programme being shown immediately before the start of the advertisement and displaying this to the user during the advertisement.

10 The system may be further configured to monitor programme changes; identify the most recently provided or broadcast programme and present the most recently provided or broadcast programme to the user in response to a channel change command.

15 The system may further include a remote control unit for generating and sending channel change commands.

According to yet another aspect of the present invention, there is provided a set-top box for  
20 controlling channel changes in a digital television or digital radio system having a digital tuner or receiver, the set top box being configured to monitor channel change commands received from a user over a zapping session; identify discarded channels; and  
25 prevent the tuner or receiver from returning to the

discarded channels during the rest of the zapping session or until it is determined that a programme transmitted on the discarded channel has changed.

According to yet another aspect of the present invention, there is provided a computer program preferably on a data carrier or a computer readable medium, for controlling channel changes in a digital television or digital radio system having a digital tuner or receiver, the computer program having code or instructions for monitoring channel change commands received from a user over a zapping session; identifying discarded channels; and preventing the tuner or receiver from tuning to the discarded channels during the rest of the zapping session or until it is determined that a programme transmitted on the discarded channel has changed.

The code or instructions for identifying discarded channels may comprise code or instructions for monitoring a time for which the viewer viewed the channel and on the basis of this, determining whether the channel is discarded. The computer program may include code or instructions for setting a viewing time threshold for use in the step of determining whether the channel is to be discarded. Various options for using the threshold to determine whether or not a

channel is to be discarded may be employed. The choice of which option to use can be made by the viewer or be pre-determined. The computer program may be adapted to discard the channel if the monitored viewing time is at most the viewing time threshold or retain the channel if the monitored viewing time is at least the viewing time threshold or discard the channel if the monitored viewing time is at least the set viewing time threshold. The code or instructions for identifying discarded channels may comprise code or instructions for receiving from a user an indication of a programme or item type that is to be discarded; monitoring the type of programme currently being provided on available channels and discarding those channels that are currently broadcasting programmes or items of the type indicated by the user. The programme type may be, for example, all sports programmes or current affairs programmes or advertisements.

The computer program may further comprise code or instructions for determining whether a programme on a particular channel has changed.

The code or instructions for determining whether a programme has changed may be operable to compare

programme identifiers for the previously scanned channel and the programme currently available. In the event that there is a match, then it is determined that the programme has not changed and so the channel is not  
5 re-introduced to a list of channels that are available for scanning. In the event that there is not a match, then it is determined that the programme has changed. In this case, the channel is re-introduced into the list of channels that can be zapped to.

10        Additionally or alternatively, the code or instructions for determining whether a programme on a particular channel has changed may comprise code or instructions for monitoring real time; identifying programme scheduling information for a particular  
15 channel and using the scheduling information and real time to determine whether there is a change in the currently broadcast programme.

The computer programme may be adapted to receive a control signal from the user that indicates that a  
20 channel zapping session is starting, this signal prompting the start of the step of monitoring the channels zapped to and those discarded. The code or instructions may be further adapted to receive from a user a signal that is indicative of a command to stop  
25 the channel zapping session.



The code or instructions may involve terminating the channel zapping session if no channel change commands are received over a pre-determined time.

The code or instructions may be operable to  
5 identify an advertisement, temporarily exclude the channel that the advertisement is being shown on from the pool of available channels and re-introduce the channel when the advertisement is finished. Alternatively, the code or instructions may be operable  
10 to identify an advertisement and show in place of the advertisement material, such as a video clip or text, which is associated with the programme that is to be shown when the advertisement is finished. The computer program may be operable to cause a portion of the  
15 programme being broadcast immediately before the start of an advertisement to be recorded and display portion of the programme to the user during the advertisement.

The computer program may be further adapted to monitor programme changes; identify the most recently  
20 provided or broadcast programme and cause the most recently provided or broadcast programme to be presented to the user in response to a channel change command.

Various aspects of the invention will now be described by way of example only and with reference to the accompanying drawings, of which:

Figure 1 is a block diagram of system that has an enhanced channel zapping capability;

Figure 2 is a flow diagram of the steps for switching into the enhanced channel zapping mode;

Figure 3 is a flow diagram of a top level process of the enhanced channel zapping capability;

Figure 4 is a flow diagram of a part of the process of Figure 3, and

Figure 5 is a flow diagram of a portion of the process of Figure 4.

Figure 1 shows a digital television 10 that includes enhanced channel-zapping functionality. The system of Figure 1 has a tuner 12, which is responsible for picking out the correct broadcast signal from the attached antenna 14 or cable distribution system. Connected to the tuner 12 is a demodulator 16 for producing a digital bit stream from the received signal. Connected to an output of the demodulator 16 is a meta-data extractor 18 for extracting from the demodulated bit stream a digital description of the TV channels included in that bit stream, as well as the TV programmes and/or items that are currently being or are scheduled to be broadcast. This 'digital description'

(or meta-data) can include any one of a number of programme identifiers. These will be described in more detail later.

After the meta-data extraction stage, the signal  
5 is passed to a video channel selector 20, which selects from the bit stream the desired digital TV channel. Connected to the video selector 20 is a video rendering module 22 for converting the selected digital TV channel signal to a viewable format. The output of the  
10 video-rendering module 22 is input to a display 24, which is typically a television screen.

In order to control channel changes, a channel change mechanism 26 is provided. This is connected to and controls the tuner 12 and the video channel  
15 selector 20 to ensure that the selected TV channel is received, decoded and displayed. The channel change mechanism 26 receives channel change commands from a channel change mode switcher 28. The channel change mode switcher 28 receives control signals from a remote  
20 control signal receiver 30, which in turn receives channel change signals from the user, a remote control unit 32, as shown. Alternatively, signals may also be received from "up" and "down" channel change controls on the front panel of the receiver.

25 In addition to forwarding routine channel changes to the channel change mechanism, the channel change

mode switcher 28 is operable to switch an 'enhanced zap' mode on and off, by forwarding channel change commands to an enhanced zap mechanism 34, instead of directly to the channel change mechanism 26.

5 Associated with the zap mechanism 34 are a memory 36 for storing the pool of channels that are available during the channel zapping session and a digital clock 38. To switch between the different mechanisms, the channel change mode switcher 28 is responsive to  
10 commands received from the user.

Figure 2 shows the steps taken when the television is switched on initially. As is standard, the receiver 12 is powered-up 40; initialised 42; a list of available channels is identified 44, and the display 24  
15 is initialised, i.e. the initial channel is picked and displayed on screen 46. The receiver 12 is then ready to receive channel change commands from the user. This can be done in two modes, these being "normal" and "enhanced zap". Typically, the default is the normal  
20 mode, with the enhanced zap mode being activated in response to a user command.

To allow the generation of the "enter enhanced zap" command, the remote control is adapted to be able to send an enhanced zap control signal, which when  
25 received is recognised by the channel change mode switcher 28 and causes the enhanced zap mechanism 34

to be activated. Typically, the remote control will have a dedicated enhanced zap button and the system is set up so that the enhanced zap button on the remote control is able to toggle between the enhanced zap mode  
5 and the normal mode.

When the television is switched on initially and the enhanced zap mode is off, the channel change mode switcher recognises 48 that the mode of operation is the normal mode. Operation is then commenced 50 in the  
10 normal mode. In this mode, signals from the remote control unit are relayed via the channel change mode switcher 28 to the channel change mechanism 28, which when received causes the channel to be changed, as is normal. However, when the enhanced zap mode is  
15 activated by the user, signals from the remote control unit are relayed by the channel change mode switcher 28 to the enhanced zap mechanism 34. The channel change mode switcher recognises this as a switch mode command  
52 and so switches to the enhanced zap mode 54. The  
20 user can change 56 from enhanced zap mode at any stage by causing the appropriate mode command to be sent. This causes the mode switcher to switch to the normal mode.

Details of the functionality provided by the  
25 enhanced zap mechanism will be described in more detail with reference to Figures 3 to 5. In essence, however,

when the enhanced zapping mode is activated, channel change commands are not passed directly to the channel change mechanism 28, but instead are sent via the enhanced zap mechanism 34. The zap mechanism 34 is operable to receive and monitor channel change commands received from the user over a zapping session. Using pre-determined criteria, the enhanced zap mechanism 34 determines which channels are of no interest to the user. In the event that the user re-starts the channel scan within the same zapping session, the enhanced zap mechanism 34 only passes on the change channel commands for those channels that have not been discarded. In this way, the enhanced zap mechanism 34 prevents the tuner or receiver from returning to the discarded channels during the rest of the zapping session or until it is determined that a programme transmitted on the discarded channel has changed.

Various methods can be used to identify the programmes that are of no interest to a viewer in a single channel zapping session and determine when the channels showing these programmes can be re-introduced into the pool of channels available for channel hopping. In one case, the enhanced channel 'zapping' mechanism 34 uses programme, or item, identifiers. Modern digital TV transmission systems broadcast, or have the ability to broadcast, extra information

concerning the current broadcast. This can include some form of digital description of the current broadcast, or a digital identifier for the programme or item being broadcast. This identifier is synonymous with the  
5 programme or item currently being broadcast, i.e. the identifier unambiguously identifies the programme or item. The channel zapping mechanism 34 is operable to monitor the identifier associated with channels that have been scanned and discarded by the user. This is  
10 done using data provided by the meta-data extraction module 18. The enhanced zap mechanism then prevents the tuner 12 from being re-tuned to these channels until either a pre-set time has elapsed or the programme identifier has changed.

15 A non-exhaustive list of identifiers includes the content reference ID (CRID) from the TV-Anytime forum; the instance meta-data identifier (IMDI) from the TV-Anytime forum; any URI, URN or URL as defined in any of the IETF RFC documents; the DAVIC/DVB URL format; the  
20 DVB event ID; the SMPTE UPID and UMID and the ISO ISAN and V-ISAN.

In another method, it is possible to identify programmes that are of no interest to a viewer and determine when the channels showing these programmes  
25 can be re-introduced into the pool of channels using event information tables (EIT). For DVB digital

television, it is mandatory to transmit event information tables (EIT) to tell the DVB television receiver about the current and next item, event or programme to be shown on a DVB service. When the EIT is  
5 used in this way it is known as the 'present/following' table. Its primary use is to help with channel hopping. It allows an on-screen display to inform the user that, "Programme A is on now," and, "Programme B is on next." In this way, the user can see, at a glance, what the  
10 service is showing at present and what it will be showing next.

EIT information is available for all services in the DVB multiplex (that is, the transmitted MPEG transport stream). Also, present/following information  
15 is 'cross carried' on other multiplexes of the same operator. Thus, on any particular platform, it is not necessary to re-tune to access the present/following information of a service carried within another multiplex.

20 In one method of enhanced channel 'zapping' a list of all the DVB services that can be viewed is used. When the enhanced 'zapping' mode is engaged, information associated with the elements of this list is used to determine whether a service is available for  
25 'zapping' or 'channel hopping.' When the mode is engaged and a channel is selected, a flag associated



with that service is set. This flag represents that the channel has been 'zapped' to. The present/following information for this service is noted. This service is now not available for channel hopping until either the  
5 present/following information for this service changes or an optional time limit has expired.

In the DVB method described above 'in-band signalling' is used to determine whether the current programme has changed. In an alternative method, TV  
10 schedule meta-data can be used. That is, the data that is broadcast within the transport stream (TS) to allow the provision of an EPG. Examples of this data include DVB-SI, and the TV-Anytime Meta-data and Content Referencing specifications. In this case, the digital TV receiver  
15 maintains a database of the current TV schedule. The digital TV receiver maintains an internal accurate clock based on data broadcast in the TS. Thus, the digital TV receiver is able to determine, in a time-based fashion, whether a programme is currently showing on air. In this  
20 case, when the enhanced 'zapping' mode is engaged, information associated with the elements of this list is used to determine whether a service is available for 'zapping' or 'channel hopping'. When the mode is engaged and a channel is selected, a flag associated with that  
25 service is set. This flag represents that the channel has been 'zapped' to. This service is now not available for

channel hopping until the digital TV receivers determines that a new programme is showing or an optional time limit has expired. As before, when channels are 'zapped' to, and discarded, they are removed from the pool of channels  
5 that can be 'zapped' to. These channels reappear in the pool of channels that can be 'zapped' to as new programmes appear on them.

It is possible to extend the enhanced zapping functionality, from working at the programme level, to  
10 also work at the programme item or segment level. When channel hopping, the viewer may regain interest in a channel if a new item is shown. For example, one news report may be of no interest, but the next may of interest. This is possible using the TV-Anytime Meta-  
15 data specification.

The TV-Anytime Meta-data specification allows the broadcaster to signal that an advertisement is currently showing. If the viewer 'zaps' to a channel that is showing an advertisement and then moves to  
20 another channel before the main programme resumes, then the viewer has not had the opportunity to assess whether or not the programme is of interest. In this case, the channel should not be removed from the pool of channels that can be 'zapped' to.

25 In this implementation of the invention, the digital TV receiver maintains a list of the digital

programme identifiers for the programmes or programme items showing on each of the digital TV services available. This method of enhanced channel 'zapping' uses a list of all the digital TV services that can be viewed. When the enhanced 'zapping' mode is engaged, information associated to the elements of this list is used to determine whether a service is available for 'zapping' or 'channel hopping.' When the mode is engaged and a channel is selected, the digital programme identifier for the programme (or item) showing on this service is noted. This service is now not available for channel hopping until a new programme or item is showing (that is a new digital programme ID is broadcast) or an optional time limit has expired. Thus, as channels are 'zapped' to, and discarded, they are removed from the pool of channels that can be 'zapped' to. These channels reappear in the pool of channels that can be 'zapped' to as new programmes appear on them.

Each of the methods described above state that discarded channels reappear in the pool of channels that can be 'zapped' to as new programmes appear on them. In an enhancement of the system, these channels are given priority. Thus, if a new programme or item appeared on a channel that was previously discarded, that channel will be selected the next time the viewer changes channel.

Priority will be given to the newest programmes and items. Thus, if a new programme or item appears on channel A and then, some time later, on channel B (where both channels A & B had been previously discarded)  
5 priority will be given to channel B and then channel A.

Current TV remote control devices have a 'channel up' and a 'channel down' button. As mentioned before, the functionality described here can be achieved with a single 'zap' button, which would nominally have the  
10 effect of a 'channel up' button. As an enhancement to this, the system could give priority to new programmes and items. Thus, hitting the "zap" button could signify that the user wishes to see 'new content' rather than the next channel in the channel list.

15 The system may be adapted to allow the user to define the criteria under which channels are discarded from and returned to the list of channels that can be 'zapped' to. For example, a time 'X' (in seconds) can be set by the user. A channel is only discarded if it is  
20 viewed for at least 'X' seconds. Otherwise, it is assumed that the channel was not properly assessed, for example because an advertisement was showing at the time. Also, an optional time limit 'Y' (in minutes) can be set by the user. Once discarded, a channel is always returned to the  
25 pool of channels that can be 'zapped' to after 'Y' minutes.

Alternatively or additionally, the system may be adapted to allow a user to discard particular types of programme. For example, the system may be operable to discard all sports channels or channels that are  
5 currently broadcasting sports programmes. In this case, when a channel is discarded, all other channels showing the same genre of programme are discarded as well. Rather than discard these channels altogether, the system may be operable to give them a lower priority than  
10 channels showing programmes of other genres. One embodiment of this uses the single 'zap' button. When a channel is discarded, the other channels showing programmes of the same genre (as the programme showing on the discarded channel) are given a low priority. Pressing  
15 the 'zap' button allows the viewer to channel hop to programmes of other genres.

If a channel is currently showing an advertisement, the enhanced zap mechanism 34 is operable to temporarily remove this channel from the  
20 pool of channels that can be zapped to. As soon as the advertisements have finished, the channel is restored, making it available for zapping (and, hence, more permanent removal from the pool of channels if discarded by the viewer).

25 Another possibility is to show a stored clip of video when zapping to a channel that is currently

showing an advertisement. In the case of an advertisement break within a programme, the last minute or so of the programme (before the break started) could be shown. In the case of a break between programmes, the receiver could present a display of the digital description of the following programme (the programme meta-data). Or, if it should be available to the receiver, a video clip from, or trailer for, the following programme could be shown.

10 A more specific description of the methodology for implementing the invention will now be given with reference to Figures 3 to 5.

Figure 3 shows various steps for implementing enhanced zapping. These steps are all carried out in the enhanced zapping mechanism of Figure 1. When the channel-zapping mode is entered, the first step 58 is to determine the initial channel to which the tuner 12 has to be tuned and various set up parameters. The first of these set-up parameters is a value for the optional timeout T1. The system is designed so that for any discarded channel, after this optional timeout has expired, the channel is re-introduced into the pool of available channels. The timeout T1 can be set by either reverting to a default value stored in the memory 36 or by prompting the user to enter a value.

Once the optional timeout T1 is determined, the type of timing that is to be used to determine whether or not channels are to be discarded is established, again by either reverting to a stored value or by prompting the user to make the appropriate selection. If the "at least" option is chosen, then channels are discarded if they are viewed for at least the time set by the user. If the "at most" option is selected, then channels are not discarded if they are viewed for at most the set time. Once the type of timing is selected, then the duration of the viewing time T2 is set. Again a default or pre-set value could be used or the user could manually enter a value.

Blocking of particular types of programme can also be set up at this stage. This can be done each time the user selects the enhanced zapping mode or alternatively, can be implemented using stored criteria.

Once the set-up parameters for the zapping session are identified, the tuner is tuned to the chosen channel 60. To do this, the channel zapping mechanism sends a command to the channel change mechanism to cause the tuner to change to the first channel chosen by the user. The timer is then set to determine the amount of time the user views that channel 62. Then the zapping mechanism waits for an event to occur 64. The events could be one of the following: expiry of the optional timeout T1;

expiry of T2; a user input, such as a channel change command; end of programme or item on an excluded channel; start of an advert on one channel in the channel pool; end of advert on one channel of the channel pool. Once  
5 an event is detected, it is processed 66.

Figure 4 shows the steps involved in the processing of an event, this processing being event dependent. The first step of this is to determine whether the event is expiry of T2. If it is then the next step 70 is for the  
10 zapping mechanism to determine the type of timing selected at set up. If the timing is "at most" then in the next step 72 it is determined that the current channel is not to be excluded when the next channel change is made. In contrast, if the timing is "at  
15 least", then the next step 74 is to exclude the current channel from the pool of available channels.

If the event is not expiry of T2, then it is determined in step 76 whether the event is timer T1 expiry for one channel. If the answer to this is yes,  
20 then at step 78 that channel is re-introduced to the pool of available channels.

If the event is identified at step 80 as being a channel change command, then the current channel is removed 82 from the available pool (if applicable) and  
25 the new channel is obtained 84. Figure 5 shows the steps for doing this in more detail. The zapping mechanism 34



firstly determines at step 102 whether the user input is a channel up or a channel down command. In the case where it is a channel up command, the new channel is identified in step 104 as being the channel in the pool of available channels that is immediately after the current channel. In the case where it is a channel down command 106, the new channel is identified in step 108 as being the channel in the pool of available channels that immediately precedes the current channel. If the user input is identified at step 110 as being a "zap" signal, the zapping mechanism finds 112 the channel that is the newest addition to the channel pool, that is the channel that is showing the most recently started programme or item. In any case, once the channel change command is received and interpreted by the zapping mechanism 34, the final step 114 is to send the appropriate control signal to the channel change mechanism 26, which in turn sends a channel change command to the tuner 12.

Returning to Figure 4, if the zapping mechanism identifies at step 88 that the event is the end of a programme or item on a channel excluded from the channel pool, then this channel is re-included 90 in the pool. If the zapping mechanism identifies 92 the start of an advertisement on a channel in the channel pool, then this channel is temporarily excluded 94 from the pool. If the event that is identified is the end of an advertisement

96, the zapping mechanism re-introduces, at step 98, the channel to the channel pool.

In any case, after an event is processed, the next step 100 is to wait for further events.

5       The above-described process of monitoring events such as user inputs and changes of television programme and reacting to these events to change the pool of available channels continues until the user exits the zapping mode and returns to a normal viewing mode.

10       Whilst the system 10 of Figure 1 is described as being included in a single self-contained enclosure such as a digital television, it will be appreciated that the channel-zapping functionality may be built into a set top box. In this case, all elements of the  
15 receiver circuitry would be within the same enclosure, but the display would be provided within a separate unit, for example a television set.

The channel zapping mechanism of the present application uses the digital TV receiver to perform  
20 part of the channel hopping task. When channel hopping up and down, people are aware of what they have 'hopped to' in the past and go into 'fast thumb' mode. This invention exploits the digital data available in the broadcast to make the process easier.

25       The channel zapping method described herein allows the user to benefit from not having to 'channel hop'

through channels showing programmes (or programme items) that he is not interested in. This is particularly advantageous for digital television systems where the number of channels and channel change  
5 times are very much greater than for analogue systems.

Whilst the invention has been described with reference to television, it will be appreciated that it could equally be applied to digital radio.

A skilled person will appreciate that variations of  
10 the disclosed arrangements are possible without departing from the invention. For example, whilst the description generally refers to programmes being broadcast, it will be appreciated that other ways for transmitting these could equally be used. Accordingly, the above  
15 description of a specific embodiment is made by way of example only and not for the purposes of limitation. It will be clear to the skilled person that minor modifications may be made without significant changes to the operation described.

## Claims

1. A method for controlling channel changes in television or digital radio having a tuner or receiver, the method involving monitoring channel change commands received from a user over a zapping session; identifying discarded channels; and preventing the tuner or receiver from returning to the discarded channels during the rest of the zapping session or until it is determined that a programme transmitted on the discarded channel has changed.

2. A method as claimed in claim 1, wherein the step of identifying discarded channels involves monitoring a time for which the viewer viewed the channel and on the basis of this, determining whether the channel is discarded.

3. A method as claimed in claim 2, comprising setting a viewing time threshold for use in the step of determining whether the channel is to be discarded.

4. A method as claimed in claim 3, wherein if the monitored viewing time is at most the viewing time threshold, then the channel is discarded.

5. A method as claimed in claim 3, wherein if the monitored viewing time is at most the viewing time threshold, then the channel is retained.

5

6. A method as claimed in claim 3, wherein if the monitored viewing time is at least the viewing time threshold, then the channel is discarded.

10 7. A method as claimed in claim 3, wherein if the monitored viewing time is at least the set viewing time threshold, then the channel is retained.

8. A method as claimed in any one of claims 3 to claim  
15 7 comprising receiving a user input indicative of the times set.

9. A method as claimed in any one of the preceding claims, wherein the step of identifying discarded  
20 channels involves receiving from a user an indication of a programme or item type that is to be discarded; monitoring the type of programme currently being provided on available channels and discarding those channels that are currently broadcasting programmes or  
25 items of the type indicated by the user.

10. A method as claimed in claim 9, wherein the programme type is sports programmes and/or current affairs programmes and/or advertisements.

5

11. A method as claimed in any one of the preceding claims comprising determining whether a programme on a particular channel has changed.

10 12. A method as claimed in claim 11, wherein the step of determining whether a programme has changed comprises comparing programme identifiers for the previously viewed channel and the programme currently available.

15 13. A method as claimed in any one of the preceding claims, wherein the step of determining whether a programme on a particular channel has changed involves monitoring real time; identifying programme scheduling information for a particular channel and using the  
20 scheduling information and real time to determine whether there is a change in the currently broadcast programme.

14. A method as claimed in any one of the preceding  
25 claims involving receiving a control signal from the

user that indicates that a channel zapping session is starting, this signal prompting the start of the step of monitoring the channels zapped to and those discarded.

5

15. A method as claimed in any one of the preceding claims, wherein the method involves receiving from a user a signal that is indicative of a command to stop the channel zapping session.

10

16. A method as claimed in any one of the preceding claims comprising terminating the channel zapping session if no channel change commands are received over a pre-determined time.

15

17. A method as claimed in any one of the preceding claims comprising identifying an advertisement, temporarily excluding the channel that the advertisement is being shown on from the pool of  
20 available channels and re-introducing the channel when the advertisement is finished.

18. A method as claimed in any one of claims 1 to 17 comprising identifying an advertisement and showing  
25 material, such as a video clip or text, which is

associated with the programme that is to be shown when the advertisement is finished.

19. A method as claimed in claim 15 further involving  
5 recording a portion of the programme shown immediately preceding the advertisement and displaying this to the user during the advertisement.

20. A method as claimed in claim 19 comprising carrying  
10 out the step of recording for all available channels.

21. A method as claimed in any one of the preceding claims comprising monitoring programme changes; identifying the most recently provided or broadcast  
15 programme and presenting the most recently provided or broadcast programme to the user in response to a channel change command.

22. A system for controlling channel changes in  
20 television or digital radio having a tuner or receiver, the system comprising means for monitoring channel change commands received from a user over a zapping session; means for identifying discarded channels; and means for preventing the tuner or receiver from tuning  
25 to the discarded channels during the rest of the



zapping session or until it is determined that a programme transmitted on the discarded channel has changed.

5 23. A system as claimed in claim 22, wherein the means for identifying discarded channels comprise means for monitoring a time for which the viewer viewed the channel and on the basis of this, determining whether the channel is discarded.

10

24. A system as claimed in claim 23, comprising means for setting a viewing time threshold for use by the means for determining whether the channel is to be discarded.

15

25. A system as claimed in claim 24, wherein if the monitored viewing time is at most the viewing time threshold, then the channel is discarded.

20 26. A system as claimed in claim 24, wherein if the monitored viewing time is at most the viewing time threshold, then the channel is retained.

27. A system as claimed in claim 24, wherein if the monitored viewing time is at least the set viewing time threshold, then the channel is discarded.

5 28. A system as claimed in claim 24, wherein if the monitored viewing time is at least the set viewing time threshold, then the channel is retained.

29. A system as claimed in any one of claims 23 to  
10 claim 28 comprising means for receiving a user input indicative of the times set.

30. A system as claimed in any one of claims 22 to 29,  
wherein the means for identifying discarded channels  
15 are operable to receive from a user an indication of a programme or item type that is to be discarded; monitor the type of programme currently being provided on available channels and discard those channels that are currently broadcasting programmes or items of the type  
20 indicated by the user.

31. A system as claimed in claim 29, wherein the programme type is sports programmes and/or current affairs programmes and/or advertisements.

32. A system as claimed in any one of claims 22 to 31 comprising means for determining whether a programme on a particular channel has changed.

5 33. A system as claimed in claim 32, wherein the means for determining whether a programme has changed comprise means for comparing programme identifiers for the previously viewed channel and the programme currently available.

10

34. A system as claimed in any one of claims 22 to 33, wherein the means for determining whether a programme on a particular channel has changed are operable to monitor real time; identify programme scheduling  
15 information for a particular channel and use the scheduling information and real time to determine whether there is a change in the currently broadcast programme.

20 35. A system as claimed in any one of claims 22 to 34 comprising means for receiving a control signal from the user indicative of the start of a channel zapping session, means for recognising the signal as a zapping session identifier and activating the means for

monitoring the channels zapped to and those discarded  
in response to the zapping command.

36. A system as claimed in any one of claims 18 to 28,  
5 comprising means for receiving from a user a signal  
that is indicative of a command to stop the channel  
zapping session.

37. A system as claimed in any one of claims 18 to 29  
10 comprising means for terminating the channel zapping  
session if no channel change commands are received over  
a pre-determined time.

38. A system as claimed in any one of claims 18 to 30  
15 comprising a display for showing the programmes on.

39. A system as claimed in any one of claims 18 to 31  
being adapted to receive channel change commands from a  
remote control.

20

40. A computer program, preferably on a data carrier or  
some other computer readable medium, for controlling  
channel changes in a television or digital radio having  
a tuner or receiver, the computer programme having code  
25 or instructions for monitoring channel change commands

received from a user over a zapping session;  
identifying discarded channels; and preventing the  
tuner or receiver from tuning to the discarded channels  
during the rest of the zapping session or until it is  
5 determined that a programme transmitted on the  
discarded channel has changed.

41. A computer program as claimed in claim 40, wherein  
the code or instructions for determining discarded  
10 channels are operable to monitor a time for which the  
viewer viewed the channel and on the basis of this,  
determine whether the channel is discarded.

42. A computer program as claimed in claim 41,  
15 comprising code or instructions for setting a viewing  
time threshold for use by the means for determining  
whether the channel is to be discarded.

43. A computer program as claimed in claim 42, wherein  
20 if the monitored viewing time is at most the viewing  
time threshold, then the channel is discarded.

44. A computer program as claimed in claim 42, wherein  
if the monitored viewing time is at most the viewing  
25 time threshold, then the channel is retained.

45. A computer program as claimed in claim 42, wherein if the monitored viewing time is at least the set viewing time threshold, then the channel is discarded.

5

46. A computer program as claimed in claim 42, wherein if the monitored viewing time is at least the set viewing time threshold, then the channel is retained.

10 47. A computer program as claimed in any one of claims 40 to 46 comprising code or instructions for receiving a user input indicative of the times set.

15 48. A computer program as claimed in any one of claims 40 to 48, wherein the code or instructions for identifying discarded channels are operable to receive from a user an indication of a programme or item type that is to be discarded; monitor the type of programme currently being provided on available channels and  
20 discard those channels that are currently broadcasting programmes or items of the type indicated by the user.

49. A computer program as claimed in claim 48, wherein the programme type is sports programmes and/or current  
25 affairs programmes and/or advertisements.

50. A computer program as claimed in any one of claims  
40 to 49 comprising code or instructions for determining  
whether a programme on a particular channel has  
5 changed.

51. A computer program as claimed in claim 50, wherein  
the code or instructions for determining whether a  
program has changed are operable to compare program  
10 identifiers for the previously viewed program and the  
program currently available.

52. A computer program as claimed in any one of claims  
40 to 51, wherein the code or instructions for  
15 identifying whether a programme on a particular channel  
has changed are operable to monitor real time; identify  
programme scheduling information for a particular  
channel and using the scheduling information and real  
time to determine whether there is a change in the  
20 currently broadcast programme.

53. A computer program as claimed in any one of claims  
40 to 51 comprising code or instructions for receiving  
a control signal from the user that indicates that a  
25 channel zapping session is starting, this signal

prompting the start of the step of monitoring the channels zapped to and those discarded.

54. A computer program as claimed in any one of claims  
5 40 to 53, wherein the code or instructions are operable  
to receive from a user a signal that is indicative of a  
command to stop the channel zapping session.

55. A computer program as claimed in any one of claims  
10 40 to 54 comprising code or instructions for  
terminating the channel zapping session if no channel  
change commands are received over a pre-determined  
time.

15 56. A set top box that includes a system or computer  
program as defined in the preceding claims.

57. A television system that includes a system or  
computer program as defined in the preceding claims.

20

58. A digital radio that includes a system or computer  
program as defined in the preceding claims.



59. A method substantially as described hereinbefore  
with reference to the accompanying drawings.

60. A system substantially as described hereinbefore  
5 with reference to the accompanying drawings and as  
shown in Figure 1.

61. A computer program substantially as described  
hereinbefore with reference to the accompanying  
10 drawings.

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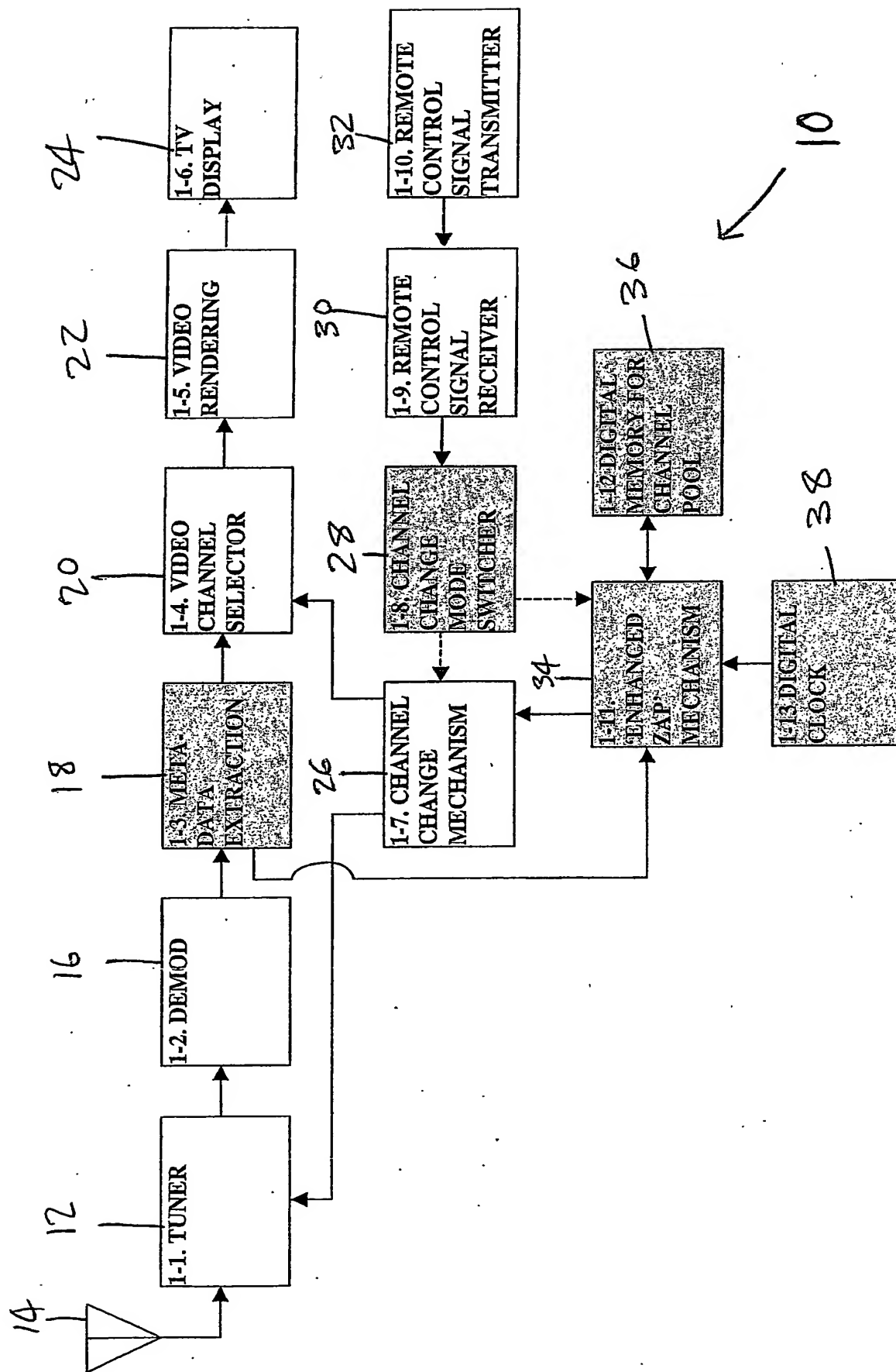


Figure 1 -- Description of TV Channel 'Enhanced Zap' Patent.



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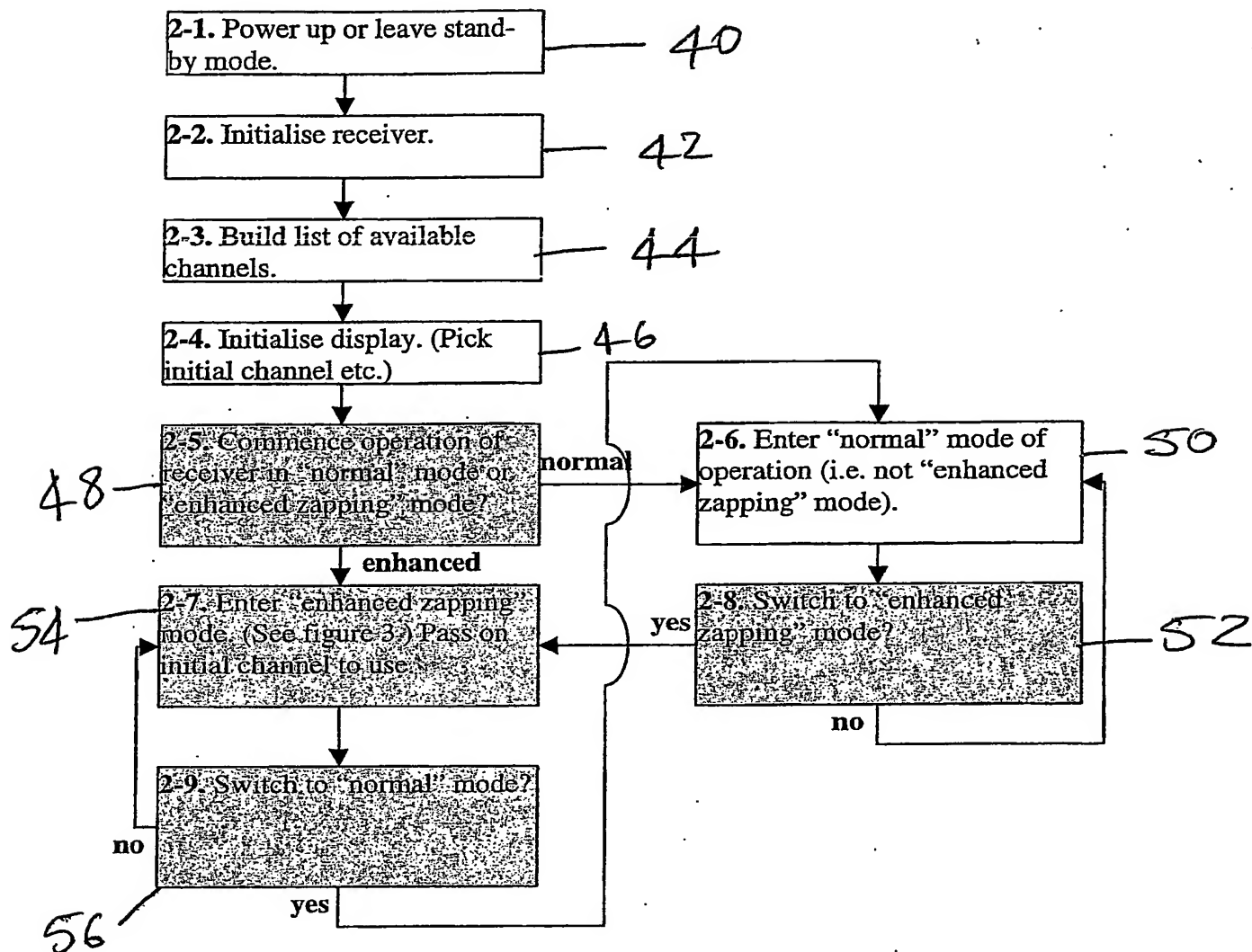


Figure 2 Initialisation of receiver - process of switching into "enhanced zapping" mode.

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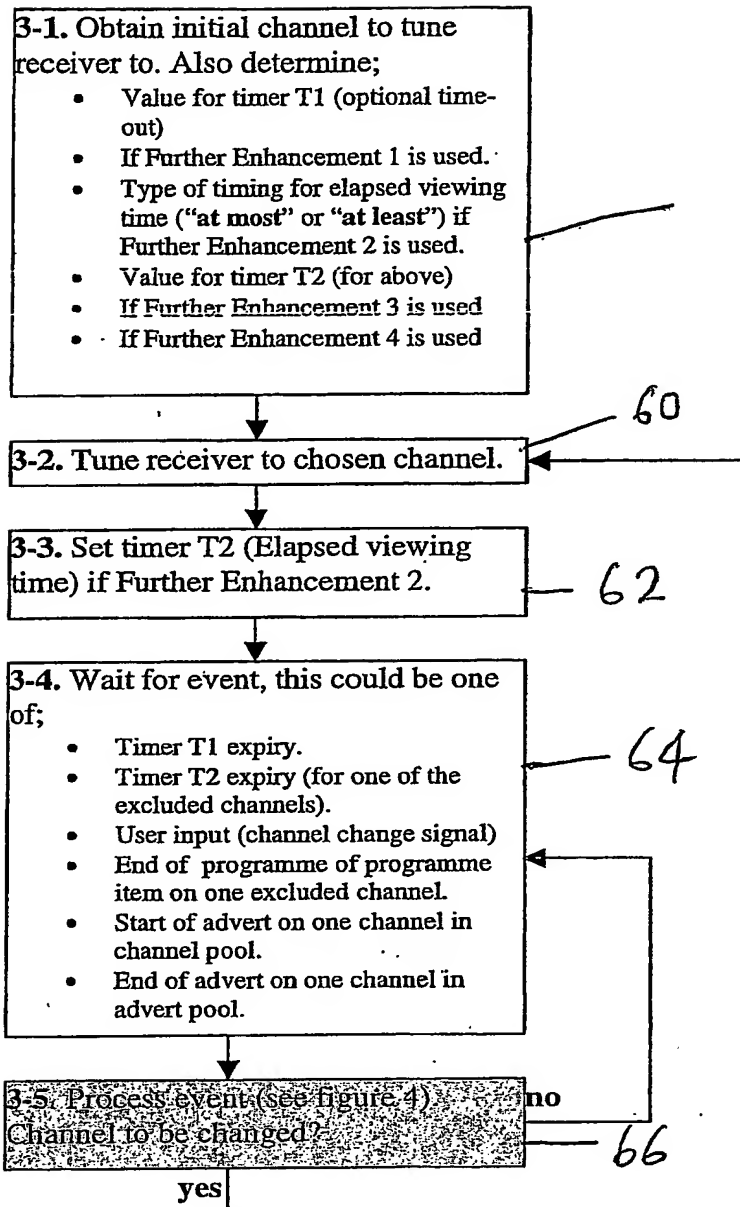


Figure 3 Top level process of "enhanced zapping" ( explanation of process inside box 2-7)

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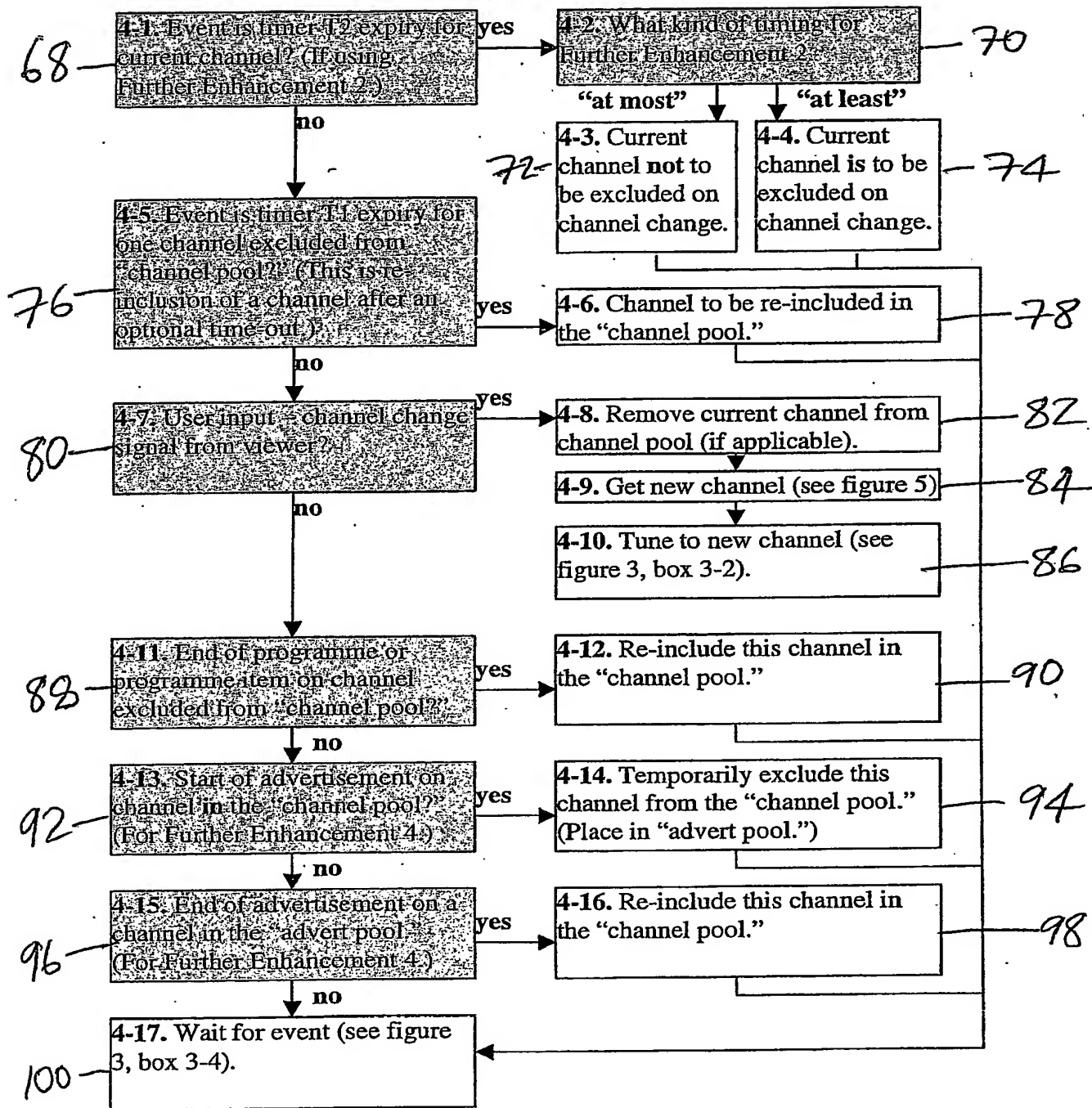


Figure 4 In depth process of "enhanced zapping" (explanation of process inside box 3-5)

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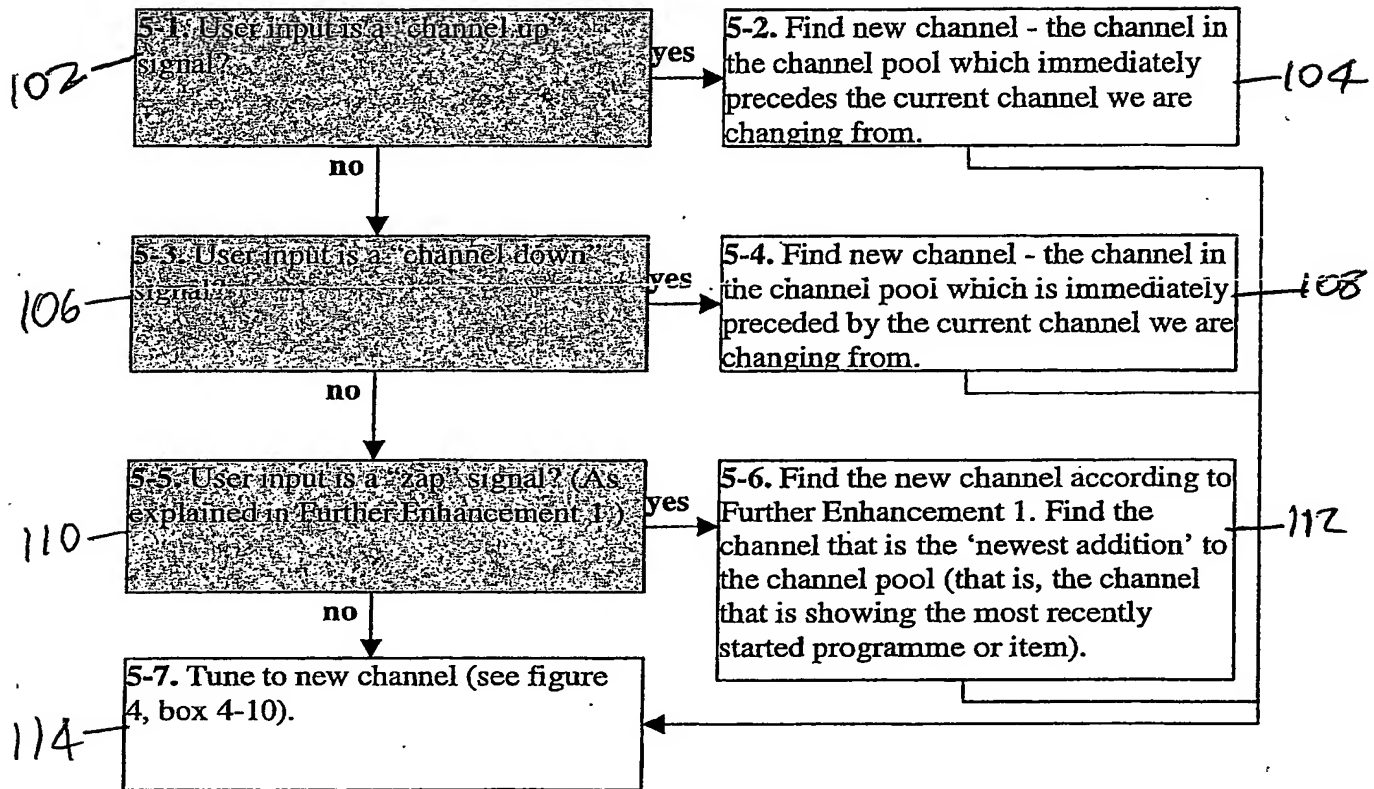


Figure 5 Process of finding a new channel (explanation of process inside box 4-9)

PCT Application

**GB0303826**

